

We claim:

1. A process for producing a 1-butene-containing C₄-hydrocarbon stream (1-C₄⁼ stream) from a 1-butene- and 2-butene-containing C₄-hydrocarbon stream (1- and 2-C₄⁼ feed stream) whose 1-butene content is lower than that of the 1-C₄⁼ stream, by
 - a) feeding the 1- and 2-C₄⁼ feed stream and a 1-butene- and 2-butene-containing C₄-hydrocarbon stream (1- and 2-C₄⁼ recycle stream) whose 1-butene content is lower than that of the 1-C₄⁼ stream and which has been produced by means of step (b) below into a distillation column and taking off the 1-C₄⁼ stream and a 2-butene-containing C₄-hydrocarbon stream (2-C₄⁼ stream) whose 1-butene content is lower than that of the 1- and 2-C₄⁼ feed stream and of the 1- and 2-C₄⁼ recycle stream from the distillation column (step a) and
 - b) producing the 1- and 2-C₄⁼ recycle stream from the 2-C₄⁼ stream by bringing the 2-C₄⁼ stream into contact with an isomerization catalyst which catalyzes the conversion of 2-butenes into 1-butene in a reaction zone (step b).
2. A process as claimed in claim 1, wherein a 1- and 2-C₄⁼ feed stream in which the ratio of 2-butenes to 1-butene is from 6:1 to 0.1:1 is used.
- 25 3. A process as claimed in either of the preceding claims, wherein a 1- and 2-C₄⁼ feed stream containing a maximum of 5% by weight of multiply unsaturated compounds or alkynes is used.
4. A process as claimed in any of the preceding claims, wherein a 1- and 2-C₄⁼ feed stream in which the content of butenes is from 30 to 100% by weight is used.
- 30 5. A process as claimed in any of the preceding claims, wherein the distillation column has from 30 to 80 theoretical plates and is operated at a reflux ratio of from 10 to 50.
- 35 6. A process as claimed in any of the preceding claims, wherein the 1-butene content, based on the sum of 1-butene and 2-butenes in the 1-C₄⁼ stream, is from 80 to 99.99%.
- 40 7. A process as claimed in any of the preceding claims, wherein the 1-C₄⁼ stream comprises

- from 60 to 99.99% by weight of 1-butene and 2-butenes and
 - from 0.01 to 40% by weight of compounds selected from the group consisting of butadienes, isobutane, n-butane and isobutene.
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8. A process as claimed in any of the preceding claims, wherein the 2-C₄⁼ stream is taken off in the lower fifth of the distillation column.

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 9. A process as claimed in any of the preceding claims, wherein the content of 2-butenes in the 1- and 2-C₄⁼ recycle stream has been reduced by from 5 to 30%, based on its content in the 2-C₄⁼ stream.

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 10. A process as claimed in any of the preceding claims, wherein a substream (C₄⁺) consisting essentially of 1-butene, 2-butenes, n-butane and hydrocarbons having 5 and more carbon atoms is taken off at the bottom of the distillation column.

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 11. A process as claimed in any of the preceding claims, wherein the temperature in the reaction zone of step b is from 200 to 500°C and the pressure is from 1 to 20 bar.
 12. A process as claimed in any of the preceding claims, wherein the conversion of 2-butenes into 1-butene, based on the content of 2-butenes in the 1- and 2-C₄⁼ feed stream, is from 70 to 99%.

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 13. A process as claimed in any of the preceding claims, wherein a 3-hexene-containing stream is prepared from the 1-C₄⁼ stream by bringing the 1- C₄⁼ stream into contact with a metathesis catalyst at from 20 to 350°C.

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 14. A process as claimed in any of the preceding claims, wherein the 1-C₄⁼ stream is freed of multiply unsaturated compounds and alkynes by subjecting it to a selective hydrogenation in the presence of a palladium-containing catalyst, in which virtually no conversion of 1-butene into 2-butenes occurs.